



Preparation and use of gamma-butyrolactones as cross-linking agents

Description of Technology: This invention relates to the preparation of gamma-butyrolactones and their use as cross-linking agents in various processes, including coating applications. Gamma-butyrolactones as cross-linking agents impart favorable properties to coating materials, do not pose serious health risks in commonly used coating processes, and therefore are suitable alternatives for isocyanates in coating compositions and application processes.

Patent Listing:

1. **US Patent No. 6,423,850**, Issued July 23, 2002, "Preparation and use of gamma-butyrolactones as cross-linking agents"

<http://patft.uspto.gov/netacgi/nph-Parser?Sect2=PTO1&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&d=PALL&RefSrch=yes&Query=PN%2F6423850>

2. **US Patent No. 6,833,460**, Issued December 21, 2004, "Preparation and use of gamma-butyrolactones as cross-linking agents"

<http://patft.uspto.gov/netacgi/nph-Parser?Sect2=PTO1&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&d=PALL&RefSrch=yes&Query=PN%2F6833460>

Market Potential: Materials commonly used for coatings, particularly those used in the automotive industry, utilize isocyanate compounds in coating formulations due to cross-linking properties of the compounds. Diisocyanate compounds react slowly at room temperature with amines and aliphatic alcohols to make polymers having urethane or urea crosslinks. Isocyanates may also cross-link with amines or alcohols during a baking step of the coating process and result in urethane or urea crosslinked polymers. Both urethanes and ureas are known to impart desirable properties in coating materials. Polymer backbones appended with hydroxyl groups or amine groups harden coating materials such as paint.

Isocyanates are volatile compounds. During the coating or baking step, persons working in the automotive industry, for example, are exposed to the vapors. Concern about the potential toxicity and health related effects associated with isocyanates suggests that alternatives are needed. The present invention discloses alternatives to isocyanates as cross-linking agents.

Benefits:

- Less toxic and safer for human use

Applications:

- Automotive industry

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